Physical Makeup of the DCO

Interesting Statistics

- As of October 2013 there are 750+ computers in the DCO, connected to 30+ network switches, 80+ power distributors and 20+ remote console servers with a total of 2100+ cables
- There are a total of 6300+ CPU cores, 15+ TiB of memory and 1.4+ PB of disk space across 1800+ spindles
- 12 air conditioners within the three zones process hot air back to normal building temperatures
- 20+ sensor nodes monitor environmental conditions in the room; most equipment can send email to alert to adverse conditions

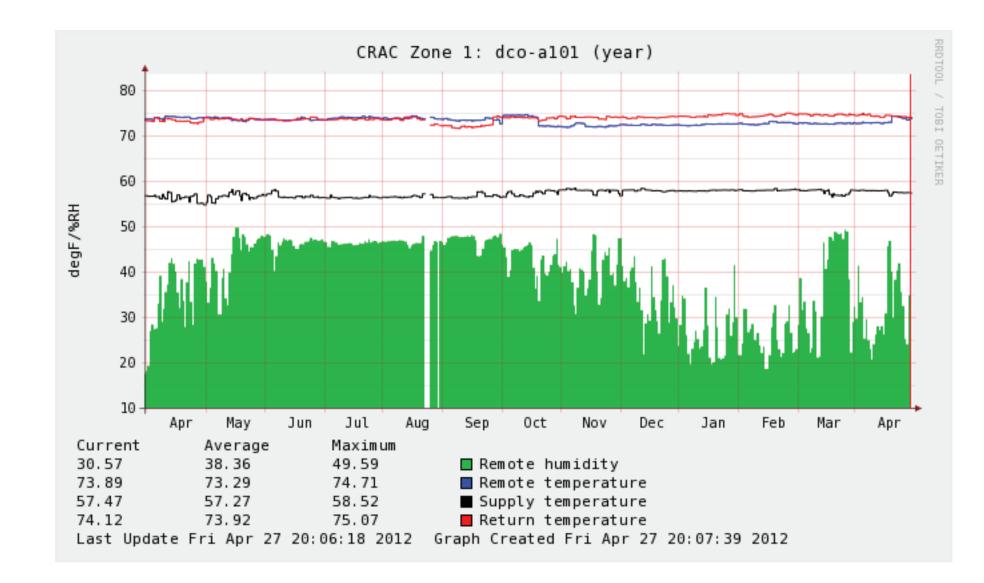
General Schematic

MONITORING / INFRASTRUCTURE

- Air temperature
- Water temperature
- Fan speed
- Humidity
- Power (quantity & quality)
- Machine status
- Network status
- Grey system for room access security

TEMPERATURE AND HUMIDITY

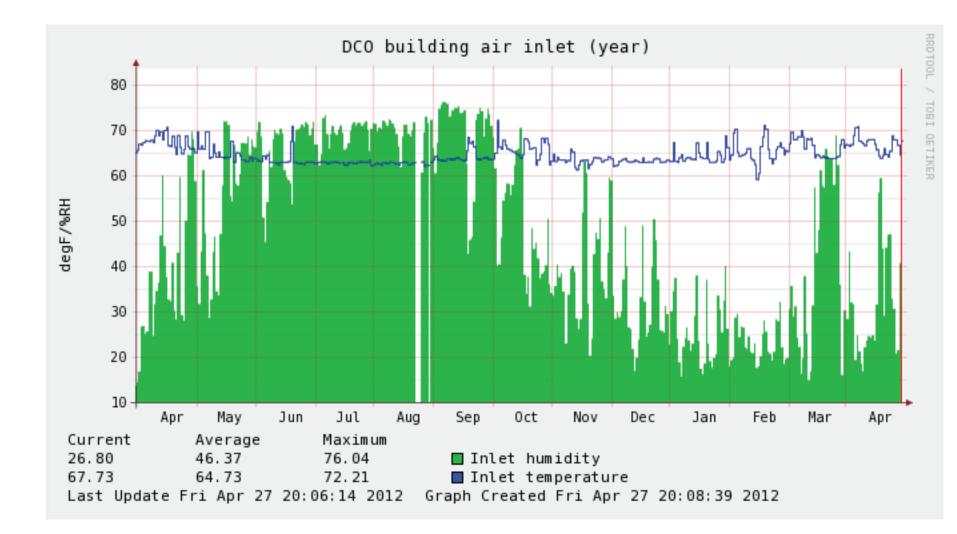
- Temp and humidity of the building's fresh air as supplied to the DCO
- Over the last year, temperature remained nearly constant
- Humidity was controlled by the DCO air conditioners at all times during the year



- Double interlock pre-action sprinkler system
- Distance-read sub-floor leak detection system
- Nagios and SNM monitoring systems

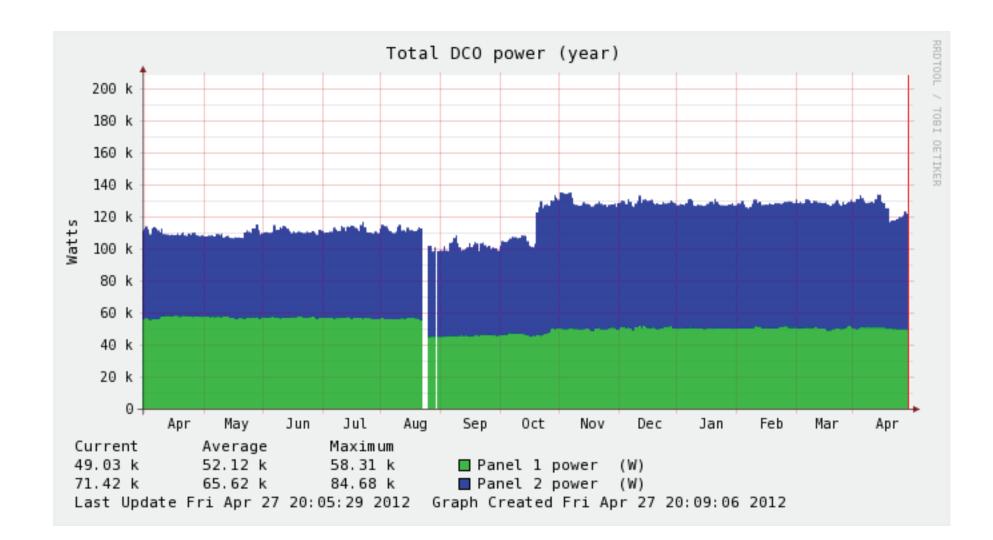


DATA CENTER OBSERVATORY



ELECTRICAL POWER CONSUMED IN THE DCO

 There are currently seven power distribution units within the computing zones, each having a capacity of around 70 kW



DCO ROOM

- Zone1: 12 Racks
- Zone2: 11 Racks
- Zone3: 10 Racks
- Hot air Containment architecture
- Exterior room air is 72°F (22°C)
- Interior (hot aisle) up to 90°F (32°C)
- Battery power for 4 minute shutdown

CIC GARAGE

- Pipes insulated and heat traced
- Pipe diameters upsized to support
 4 minutes of operation in the event
 of a campus loop failure

PUMP ROOM

- Redundant heat exchangers and

Carnegie Mellon University CyLab pumps; use cycled for even wear

- Pumps have back-up generators
- Pumping system also includes:
 - chemical feeder to prevent inline algal growth
 - expansion tank
 - air separator unit

